

3.6

Order of Operations with Rational Numbers

FOCUS

- Explain and apply the order of operations with rational numbers.

Two students were asked to evaluate: $(-8) - 2(24 \div (-8))^2$

Here are their calculations.

$$\begin{aligned} & (-8) - 2(24 \div (-8))^2 \\ &= (-10)(24 \div (-8))^2 \\ &= (-10)(-3)^2 \\ &= (-10)(9) \\ &= -90 \end{aligned}$$

$$\begin{aligned} & (-8) - 2(24 \div (-8))^2 \\ &= (-8) - 2(-3)^2 \\ &= (-8) - (-6)^2 \\ &= -8 - 36 \\ &= -44 \end{aligned}$$

Why did both these students get incorrect answers?

What is the correct answer?

Sep 22-9:41 PM

Example 1

Using the Order of Operations with Decimals

Evaluate.

a) $(-0.8) + 1.2 \div (-0.3) \times 1.5$ b) $(-3.2) - 0.9 \div [0.7 - (-1.2)]^2$

SOLUTION:

a) $(-0.8) + 1.2 \div (-0.3) \times 1.5$

b) $(-3.2) - 0.9 \div [0.7 - (-1.2)]^2$

Sep 22-8:25 PM

Example 2 Solving Problems Using the Order of Operations

To convert a temperature in degrees Fahrenheit to degrees Celsius, we use the formula:

$$C = \frac{F - 32}{1.8}$$

In Fort Simpson, Northwest Territories, the mean temperature in December is -9.4°F . What is this temperature in degrees Celsius?

SOLUTION:

Sep 22-8:25 PM

Example 3 Using the Order of Operations with Fractions

Evaluate.

$$\left(-\frac{1}{2}\right)\left(-\frac{1}{2}\right) - \left(-\frac{2}{3}\right) \div \left[\frac{1}{3} + \left(-\frac{3}{12}\right)\right]$$

SOLUTION:

$$\left(-\frac{1}{2}\right)\left(-\frac{1}{2}\right) - \left(-\frac{2}{3}\right) \div \left[\frac{1}{3} + \left(-\frac{3}{12}\right)\right]$$

Sep 22-8:25 PM

Discuss the ideas

1. What does a fraction bar indicate?
2. As the number of operations increases and the expressions become more complex, it is easy to make mistakes.
What can you do to prevent yourself making mistakes?

Reflect

When you use the order of operations with rational numbers, do you prefer to work with the numbers in decimal form or fraction form? Explain your choice.

Sep 22-9:21 PM

Practice

Page 140 # 4,7,8

Page 141 # 11,12,13

Page 142 # 17,18

If Finished in class then attempt these questions

Page 142 # 19, 20, 21

Sep 22-9:33 PM